

CLAIMS

1. A method for validating a fragment of a structured document comprising steps of:
 - a. compiling an XML schema definition,
 - 5 b. storing said XML schema definition,
 - c. receiving as input said stored XML schema definition and a fragment of a
structured document into a runtime validation engine, and
outputting a validation pass or fail on the basis of said input.
- 10 2. A method of validating a fragment of a structured document, as per claim 1,
wherein said structured document is an XML document.
3. A method for validating a fragment of a structured document, as per claim 1,
wherein said runtime validation engine is comprised of a generic parser and a
15 runtime schema validation parser.
4. A method for validating a fragment of a structured document, as per claim 3,
wherein said generic parser is a generic XML parser.
- 20 5. A method of preparing a fragment of a structured document for validation
comprising steps of:
 - a. locating a start state for said validation process from a type-mapping table,

b. obtaining a token from said structured document fragment,
c. determining whether said token is of element type said structured document fragment is to be validated against,
d. checking whether said token signifies end of said structured document,
5 and
returning a validation success or a validation failure, based on said determining and checking steps.

6. A method of preparing a fragment of a structured document, as per claim 5,
10 wherein said structured document is an XML document.

7. A method of preparing a fragment of a structured document, as per claim 5,
wherein said token is either an element type name or an attribute name.

15 8. A method of preparing a fragment of a structured document, as per claim 5,
wherein if in said determining step it is determined that said token is not of said element type, returning a validation failure, else repeating process from said obtaining step.

20 9. A method of preparing a fragment of a structured document, as per claim 5,
wherein if in said checking step it is determined that said token signifies end of said structured document, said validation process terminates.

10. A method of preparing a fragment of a structured document, as per claim 5, wherein said validation process is repeated from said obtaining step until said validation process returns a validation failure or it is determined in said checking
5 step that said obtained token signifies end of said structured document and said validation process terminates.

11. A method of constructing a type-mapping table comprising steps of:

- a. building a type hierarchy ordered tree from a structured document schema,
- 10 b. supplying input to an element validation module,
- c. creating a type-mapping table entry for a current element type in said structured document schema,
- d. traversing said type hierarchy ordered tree, and
populating a type-mapping table with type-mapping entries created in said
15 creating step.

12. A method of constructing a type-mapping table, as per claim 11, wherein said structured document schema is an XML schema.

20 13. A method of constructing a type-mapping table, as per claim 11, wherein said method takes as input an AAE.

14. A method of constructing a type-mapping table, as per claim 13, wherein said AAE is comprised of an annotation hierarchy and an automaton encoding.

15. A method of constructing a type-mapping table, as per claim 11, wherein said data
5 structures and variables are comprised of a token array, a variable holding the index of the last token received, and a variable holding the index of start token received.

16. A method of constructing a type-mapping table, as per claim 11, wherein said
10 type-mapping table entry for said element type is formed by supplying a start token from an annotation record to an element validation module.

17. A method of constructing a type-mapping table, as per claim 11, wherein said
15 element validation module is reset after each entry is created for each element type.

18. A method of constructing a type-mapping table, as per claim 11, wherein said data
structures are initialized and said variables are set to zero after an entry has been
created for each element type.

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19. A method of constructing a type-mapping table, as per claim 11, wherein said
type-mapping table entries are comprised of a result path to current element type,

a current element type, an annotation record for current element type, and a current state.

20. A method of constructing a type-mapping table, as per claim 11, wherein said
5 process is repeated for each global element child type.

21. A method of constructing a type-mapping table, as per claim 11, wherein said
traversing step further comprises steps of:

- 10 a. determining whether an entry has been created for all element types in said
schema,
- b. appending a start token of a current sub-element type to a token array data
structure,
- c. incrementing an environment variable representing an index for a last
token
- 15 d. supplying said token to said element validation module,
- e. creating an entry for said current sub-element type in said type-mapping
table, and
- f. updating data structures and variables.

20 22. A method of constructing a type-mapping table, as per claim 21, wherein said
traversing step takes as input an AAE, said current element type, and said data
structures and variables.

23. A method of constructing a type-mapping table, as per claim 21, wherein said entry is comprised of a result path for said current sub-element type, an element type name for said current sub-element type, an annotation record for said current sub-element type, and a current state.

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24. A method of constructing a type-mapping table, as per claim 21, wherein if said current sub-element type is a reference to a global element type, said result path is a union of the path from root of said schema to said current sub-element type and the result path in a type-mapping entry in said type-mapping table of said referenced global type; otherwise said result path is the path from root of said
10 schema to said sub-current element type.

25. A method of constructing a type-mapping table, as per claim 24, wherein said updating step further comprises steps of:

- 15 a. setting a current index variable equal to an index variable representing an index of last token and
- b. pushing an annotation record for said current sub-element type and said current index of said token array onto a temp stack.

20 26. A method of constructing a type-mapping table, as per claim 21, wherein said traversing step is recursively performed until type-mapping entries are created for all sub-element types descending from said current element type.

27. A method of constructing a type-mapping table, as per claim 21, wherein if it is determined in said determining step that an entry has been created for all element types in said schema; an end token is appended to said token array, said token is supplied to said element validation module, an annotation record for said current
5 sub-element type is obtained from said temp stack, all tokens from a subset of indices within said token array are supplied to said element validation module, and said process terminates.

28. An article of manufacture comprising a computer usable medium having
10 computer readable program code embodied therein which implements the validation a fragment of a structured document, said medium comprising:

- a. computer readable program code compiling an XML schema definition,
- b. computer readable program code storing said XML schema definition,
- c. computer readable program code receiving as input said stored XML
15 schema definition and a fragment of a structured document into a runtime validation engine, and

computer readable program code outputting a validation pass or fail on the basis of said input.

20 29. An article of manufacture comprising a computer usable medium having computer readable program code embodied therein which implements the construction a type-mapping table, said medium comprising:

- a. computer readable program code building a type hierarchy ordered tree from a structured document schema,
 - b. computer readable program code supplying input to an element validation module,
 - 5 c. computer readable program code creating a type-mapping table entry for a current element type in said structured document schema,
 - d. computer readable program code traversing said type hierarchy ordered tree, and
- computer readable program code populating a type-mapping table with type-
- 10 mapping entries created in said creating module.